UNIVERSITY of VIRGINIA
BIOCOMPLEXITY INSTITUTE

UVA COVID-19 MODEL WEEKLY UPDATE

VDH VIRGINIA DEPARTMENT OF HEALTH

February 18th, 2022

KEY TAKEAWAYS

- Case rates are quickly falling across the Commonwealth. All but one district is in decline. All neighboring states are also in decline.
- For the second week in a row, the effective reproduction number (R_e) is below 0.85 for all regions, and below 0.7 statewide.
- Case rates remain very high for some rural parts of the state, in particular counties in Southside and the Far Southwest. Residents in these regions should wear a mask when in indoor public places.
- The BA.2 subvariant now accounts for 6.2% of new cases in Virginia. We estimate that it will become dominant by mid-March.
- Models suggest that case rates will continue to decline across the Commonwealth. The arrival of the BA.2 subvariant may slow this decline, but the decline is expected to continue.
- Vaccination remains effective against the BA.2 subvariant, particularly by markedly reducing hospitalization and death.

47 per 100k
Average Daily Cases Week Ending Feb. 13, 2022

(187 per 100k)
*Adaptive Scenario Forecast Average Daily Cases, **Already Peaked** on Jan. 16, 2022*

2,084 / 2,964
Average Daily 1st / 2nd Doses Feb. 13, 2022

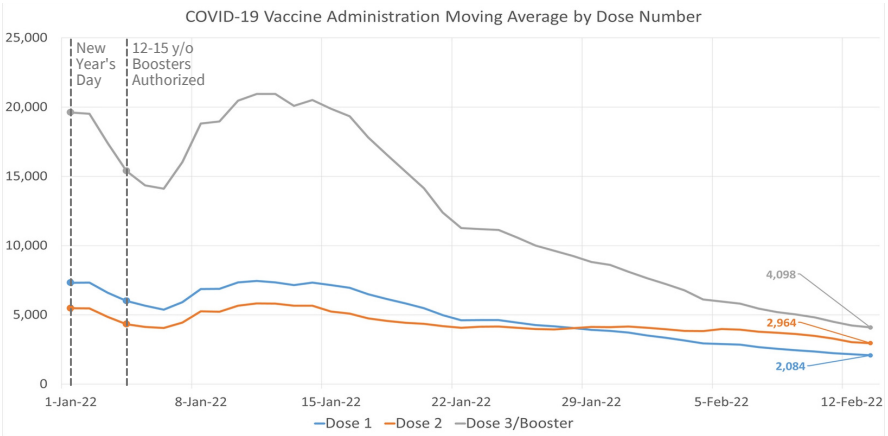
4,098
Average Daily Boosters Feb. 13, 2022

KEY FIGURES

Reproduction Rate
(Based on Confirmation Date)

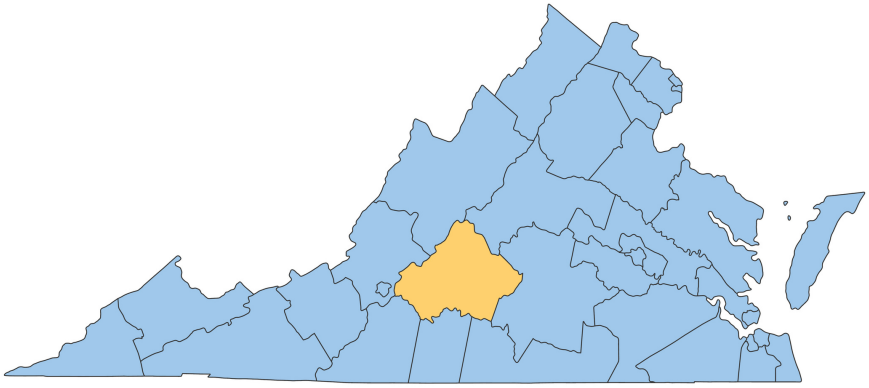
Region	R_e Feb. 14th	Weekly Change
Statewide	**0.666**	**0.090**
Central	0.617	0.209
Eastern	0.473	0.031
Far SW	0.764	-0.028
Near SW	0.825	0.051
Northern	0.641	0.019
Northwest	0.744	0.036

Vaccine Administrations



Growth Trajectories: 0 Health Districts in Surge

Status	# Districts (prev week)
Declining	34 (34)
Plateau	0 (0)
Slow Growth	1 (0)
In Surge	0 (1)



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THE MODEL

The UVA COVID-19 Model and these weekly results are provided by the UVA Biocomplexity Institute, which has over 20 years of experience crafting and analyzing infectious disease models. It is a county-level **S**usceptible, **E**xposed, **I**nfected, **R**ecovered (SEIR) model designed to evaluate policy options and provide projections of future cases based on the current course of the pandemic. The Institute is also able to model alternative scenarios to estimate the impact of changing health behaviors and state policy.

COVID-19 is a novel virus, and the variant mix changes periodically. The model improves as we learn more.

THE SCENARIOS

Unchanged: The models use various scenarios to explore the path the pandemic is likely to take under differing conditions. As the CDC now estimates that the Omicron variant represents >99% of all new cases in Virginia, all prior Delta variant scenarios have been retired. All current scenarios are based on the immune escape and transmission profiles of the Omicron variant. As before, models use COVIDcast surveys to estimate county-level vaccine uptake. They then assume that vaccinations increase steadily in each county until this value is reached and 40% of vaccinated individuals receive a booster.

The new "**Adaptive**" scenario assumes that Omicron is as transmissible as Delta but adds an immune escape of 80%. This represents the current course of the pandemic and assumes that there will be no significant changes in interventions or transmission rates in the near future. Note that this scenario was called "Adaptive-Omicron" until January 21st.

The "**Adaptive-Spring**" scenario is meant to approximate the epidemic trajectory seen in the Spring of 2021. In this scenario, transmission rates from now until mid-March are manually set to reflect the falling transmission rates from the same time last year, then boosted by Omicron's enhanced transmissibility and immune escape. The "**Adaptive-DecreaseControl**" scenario explores the effects of a hypothetical increase in transmission rates. It is meant to demonstrate that continuing preventive measures are important despite Omicron's milder illness. The "**Adaptive-VariantBA2**" scenario adjusts for the new Omicron BA.2 subvariant's enhanced transmissibility, and assumes it will reach 95% prevalence by April 1st.

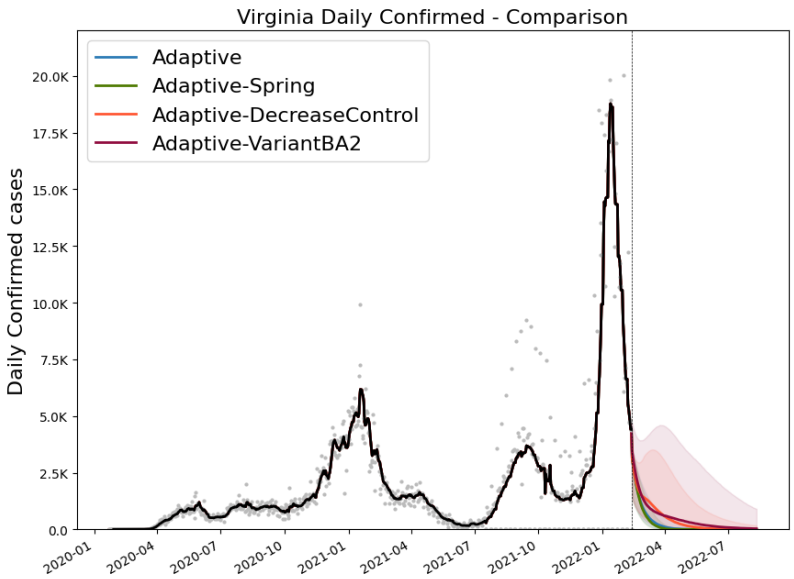
MODEL RESULTS

Updated: The current course "**Adaptive**" scenario (blue) shows a continued decline in case rates, with Virginia reaching fewer than 1,000 daily cases by the end of February. The "**Adaptive-Spring**" scenario (green) is similar, but the quicker decline in case rates results in 3,500 fewer cases by April.

The "**Adaptive-DecreaseControl**" (shown here in orange) projects a slower decline and results in 23,500 additional cases by April and keeps Virginia above 1,000 daily cases until mid-March.

The "**Adaptive-VariantBA2**" (maroon) projects an even slower long-term decline, but no second surge. It keeps Virginia above 1,000 daily cases until mid-March, and above 500 until mid-April.

Please do your part to drive down cases. Practice good prevention, including indoor masking, social distancing, self-isolating when sick, and get vaccinated and boosted as soon as possible.



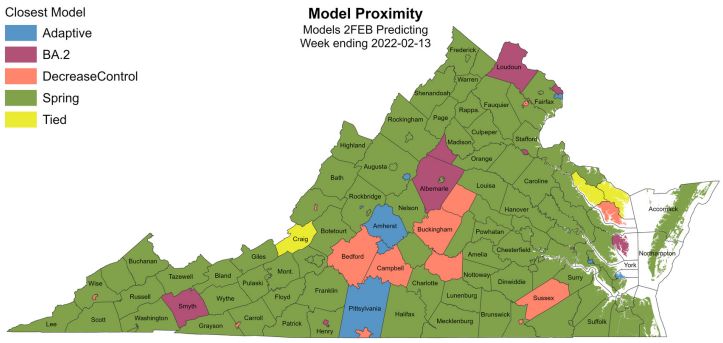
Date of Latest Model Run: 2022-02-16

OPTIMISM, WITH A SIDE OF CAUTION

It is hard not to be excited by the last few weeks. Case rates are falling precipitously. The statewide reproduction number (R_e) has hovered around 0.65 for two weeks. For the first time since early December 2021, not a single health district is in surge. And for two weeks in a row, 34 of 35 districts are in decline. Moreover, models suggest this trend will continue.

When we compare last week's case rates to model projections from Feb. 2nd (below), the Spring scenario proved the best fit for most counties. This is the most optimistic of all scenarios, and for many counties, cases fell even more quickly than this scenario projected. If this trend continues, we can expect a mild March.

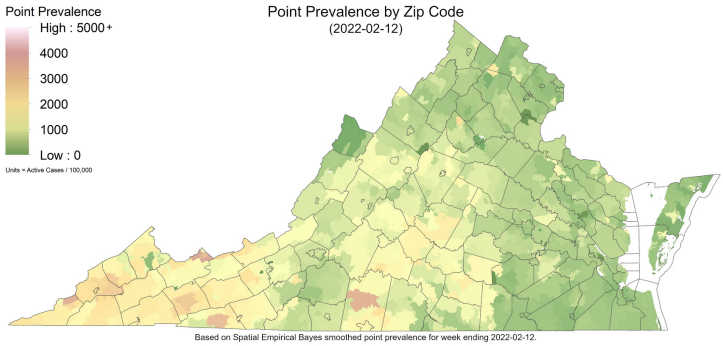
The Behemoth Roller Coaster by Jason Zhang (Creative Commons).



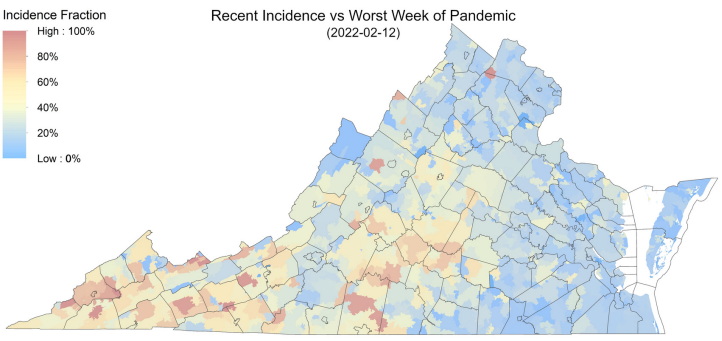
This map shows which of the four scenarios, from models run on Feb. 2, did the best job of estimating last week's total cases by county.

A Hint of Restraint

The epidemic trajectory of the Omicron wave looks a bit like a roller coaster. A rapid climb to never-before-seen heights, followed by a tremendous and rapid descent. But like a roller coaster, the front of the train reaches the ground before the rest of the cars. This is the case for the Commonwealth as well. The urban centers in Northern and Eastern Virginia peaked early and have since declined. But more rural parts, in Southside and the Far Southwest, only peaked last week. These counties are still seeing extremely high levels of community transmission. Residents should continue preventive measures for now.



This map shows estimated weekly point prevalence by zip code. The Far Southwest is still seeing extremely high prevalence rates.



This map compares last week's incidence to that of the worst week of the pandemic. Areas shown in red are still near their pandemic peaks.

What about BA.2?

Though still rare in Virginia, the BA.2 Omicron subvariant has recently become dominant across Northern Europe. It currently accounts for about 6.2% of new cases in the Commonwealth, but with a doubling time of about a week, we expect it to become dominant by mid-March. BA.2 has a slight transmission advantage over Omicron, spreading more easily. Research on BA.2 is still ongoing, but some early studies suggest it might be able to cause more severe disease than BA.1. It may also be resistant to current monoclonal antibody treatments. That said, the differences between the two subvariants do not seem extreme. Current models suggest that the arrival of BA.2 may slow our downward trajectory, but we do not expect it to cause another surge at this time.

Governor's Vaccination Plan

Vaccination is effective against BA.2, and is still the best protection against severe disease, hospitalization, and death. It is also our best bet at preventing another hospital-filling surge in the future. Accordingly, Governor Youngkin has released a PSA on YouTube encouraging Virginians to get vaccinated as soon as possible, and plans to sponsor 120 COVID-19 vaccination events across Virginia.